AF IFW
2155

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Stephen F. Bush et al.	§	Group Art Unit: 2155
Serial No.: 09/697,562	§	Examiner: Philip B. Tran
Filed: October 26, 2000	§	
For: COMMUNICATIONS NETWORK FOR DYNAMIC REPRIORITIZATION	§	Atty. Docket: RD27644-2/YOD GERD:0239

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING
37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below:

October 7, 2005 — Date
Lynda Howell

3

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on June 1, 2005, and received by the Patent Office on June 7, 2005.

The Commissioner is authorized to charge the requisite fee of $500.00, and any additional fees which may be necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. RD27644-2/YOD (GERD:0239).

Appellants hereby request a two (2) month extension in the statutory period for submission of the Appeal Brief, from August 7, 2005 to October 7, 2005, in accordance with 37 C.F.R. § 1.136. The Commissioner is authorized to charge the requisite fee of $450.00, and any other fee that may be required, to Deposit Account No. 07-0868; Order No. RD27644-2/YOD (GERD:0239).

1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Stephen Bush recorded at reel 011271, frame 0101, and dated October 26, 2000. Accordingly, General Electric Company will be directly affected by the Board's decision in this Appeal.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. STATUS OF CLAIMS

Claims 1-14 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal.

4. STATUS OF AMENDMENTS

A formal amendment to claim 5 (to correct dependency) and to claim 10 was filed in response to the Final Office Action filed on March 4, 2005. In the Advisory Action mailed on March 28, 2005, the Examiner indicated that the amendment was not entered. The amendments are not substantive in nature, but are merely intended to place the claims in proper form for appeal or allowance. Because the amendment does not require consideration or search, Appellants urge the Board to instruct the Examiner to enter the amendment. The Appendix listing on page 10 includes the amendment made after the final rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates generally to the field active network management. *See* Application, page 1, line 7. More particularly, in certain embodiments, the invention relates to active networks having at least one node capable of being programmed to dynamically adjust the individual priorities of messages in queue at that node.

Traditional methods of message prioritization are proving inadequate to satisfy the data communication demands of many modern warfare and other demanding and dynamic scenarios. A further complication in such situations is introduced by the requirement that the data communications network must degrade *gracefully* (i.e., not abruptly) if the network suffers occasional and cumulative damage incident to active hostilities of other unavoidable occurrences. The combination of increasing data demands and degraded network throughput capacity constitute motivation for devising a new data communications architecture and concomitant operating procedures for the following two reasons:

First, various classes of data messages have value, or utility, that changes with time. In situations where capacity becomes stressed or degraded to the point that the expected stay of a message in queue is significant compared to the time scale of its value dynamics, there is a need to consider reprioritization. Further, the value, or utility, of a message is often not intrinsic but rather depends upon other messages.

Secondly, data communication cannot be practiced by itself, in a vacuum so to speak. Rather, it must be crafted as a function of a coequal system with computation. Since the two are often inextricably linked, optimization must involve synergy through their linkage.

The Application is directed to improving the shortcomings of traditional communications systems in dynamic and demanding situations by providing a novel scheme for reprioritization of messages.

The Application contains three independent claims, namely, claims 1, 4 and 9, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a communications network (e.g., 100) comprising at least one source unit (e.g., 120) configured to generate messages for relay. The communications network (e.g., 100) comprises a smart node (e.g., 110) capable of storing programming instructions, receiving messages for relay from the source unit, determining at least a merit value for the received messages, dynamically reprioritizing the received messages for relay based upon the merit value, and transmitting the reprioritized received messages. The network (e.g., 100) further includes at least one portal node (e.g., 150) adapted to receive the reprioritized received messages transmitted from the smart node. *See, e.g., id* at page 3, lines 19-25 and page 4, lines 1-6; *see also* FIG. 1.

With regard to the aspect of the invention set forth in independent claim 4, discussions of the recited features of claim 4 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a communications network (e.g., 100) comprising at least one source unit (e.g., 120) configured to generate messages for relay and a smart node (e.g., 110) capable of receiving programming instructions, storing the programming instructions, receiving messages for relay from the source unit, storing the received messages for relay in a queue, determining at least a merit value for the received messages, and dynamically reprioritizing the received messages for relay in the queue based upon the merit value. The network (e.g., 100) further includes at least one portal node (e.g., 150) adapted to receive the retransmitted received messages from the at least one smart node for relay and at least one communications node (e.g., 160) adapted to send the programming instructions to the smart node. *See, e.g., id* at page 3, lines 19-25 and page 4, lines 1-6; *see also* FIG. 1.

With regard to the aspect of the invention set forth in independent claim 9, discussions of the recited features of claim 9 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method for dynamic reprioritizing messages. The method comprises receiving messages from a source unit (e.g., 120), storing the received messages in a buffer unit and determining a merit value for the received messages. The method further includes reprioritizing the received messages based upon the merit value and transmitting the reprioritized received messages.

Each of these claims recites elements that are clearly different and distinguishable from the teachings of the prior art, as discussed below.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

First Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's first ground of rejection in which the Examiner rejected claim 10 under 35 U.S.C. § 112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter.

Second Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's second ground of rejection in which the Examiner rejected claims 1-6, 9, 11-14 under 35 U.S.C. § 102 (e) as being anticipated by U.S. Patent No. 6, 570, 876 (hereinafter, "Aimoto").

Third Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's third ground of rejection in which the Examiner rejected claims 7, 8 and 10 under 35 U.S.C. § 103 (a) as being unpatentable over Aimoto in view of U.S. Patent No. 6, 324, 570 (hereinafter, "Tonchev").

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Sections 112, 102 and 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants strongly believe that claims 1-14 are currently in condition for allowance.

First Ground of Rejection for Review on Appeal:

As noted above, Appellants had submitted claim amendments after the Final Office Action that resolve the rejections under 35 U.S.C. §112. Accordingly, Appellants request that the Board instruct the Examiner to enter the amendments, and reverse the rejection under Section 112.

Second Ground of Rejection for Review on Appeal:

Claim 1 and the claims depending therefrom

Claim 1 recites, *inter alia*, a communications network that includes at least one source unit configured to generate messages for relay, and a "smart node". The node is capable of storing programming instructions, receiving messages for relay from the source unit, determining at least a merit value for the messages, dynamically reprioritizing the received messages based on the merit value and transmitting the reprioritized received messages. The communications network also includes at least one portal node adapted to receive the reprioritized received messages transmitted from the smart node.

The Examiner based the rejection on a comparison of the communications network in the present application with the packet switching network disclosed by Aimoto. Aimoto does not teach the communications network recited in claim 1 for at least the reasons summarized below.

First, the merit value recited in claim 1 is different from the priority value disclosed by Aimoto. In the claimed system, the communications network is configured to receive messages for relay from the source unit. The communications network then determines a merit value for each of the received messages and dynamically reprioritizes the received messages based on the determined merit values. The merit value, in the present application, is defined as being inversely proportional to the position dilution of precision (PDOP). PDOP is further defined as the calculus of choice for comparing the relative merits of individual position estimates of individual target location estimates.

Appellants wish to highlight that the present application, and particularly claim 1, relates to active network management. As will be appreciated by a person of ordinary skill in the art, in dynamically changing scenarios, target locations are not always stationary. Because the target locations change with time, it is of significance that decisions for locating any such target have to be made taking into account the location of the movable target.

The network of claim 1, then, determines a merit value dynamically, i.e., taking into account the changing coordinates of a moving target. It must be noted that the smart node continuously sends information about the target location and that the communications network continuously determines the merit value for each message received from the smart node.

Sections (*e.g.*, at page 4, line 25 through page 5, line 16) in the present application that relate specifically to the subject matter recited in claim 1 describe this operation as follows:

> In this example, the target locations are estimated and a directed energy (DE) weapon is issued against them. The probability that the DE weapon will be effective on any particular firing is a strong function of the merit of the individual target location estimate. The greater the volume of uncertainty within which the target is to be found, the

> greater the number of weapon commitments, or, equivalently, DE firings, is necessary to neutralize that target. The number of targets in a real situation may be quite large and the number of objects in the target field very large due to shroud components, tank fragmentation and so on as taught by E. W. Reed, E. C. Henry, and A. Crosby in their article "THAAD System Loading Capacity Evaluation in Anticipated Tactical Field Environments" published in the Proceedings of Radar 97, 1997, pp. 352-355, and by D. E. Mosher in his article "The Grand Plans" published in IEEE Spectrum, September 1997, pp. 28-39.
>
> The calculus of choice for comparing the relative merits of individual target location estimates is the Position Dilution of Precision, or PDOP. The PDOP for an individual target is computed by taking the square root of the trace of the matrix $(H^T H)^{-1}$ where H is a matrix of the direction cosines of an individual target measured from the sensors and T signifies transpose. For the instant example,
>
> $$H = \begin{pmatrix} a_{x,1} & a_{y,1} & a_{z,1} \\ a_{x,2} & a_{y,2} & a_{z,2} \\ \vdots & \vdots & \vdots \\ a_{x,S} & a_{y,S} & a_{z,S} \end{pmatrix}$$
>
> where $(a_{x,i}, a_{y,i}, a_{z,i})$ are the direction cosines of the target measured from sensor . The smaller the value of the PDOP for a particular set of sensors and particular target, the higher the merit of the particular target location estimate. Merit may thus be defined as 1/PDOP. At a minimum, three sensors are required to triangulate a target based on its measured direction cosines.

Aimoto, on the other hand, discloses a packet switch that receives the variable length packets. The packet switch is further configured to control transmission of the packets *according to priority already contained in the packets*. Aimoto specifically discloses that the packets *already contain priority information* before the packet switch receives them. *See,* Aimoto, col. 8, lines 25-38. Further, Aimoto discloses that it is only the packet priority information contained in the incoming packets that determines the processing priority of the packets:

> A packet **30** comprises a header portion **31** and a data portion **32**. The header portion **31** includes packet priority information **33**, a service request **34**, protocol information **35**, a source address **36**, and a destination address **37**. The packet priority information **33** indicates the processing priority of the packet. The service request **34** indicates the information of a service requested by the packet, for example, a request for reliability and high speed performance. These items are equivalent to the priority (0 to 2nd bits), the low delay request (3rd bit), the high through-put request (4th bit), and the high reliability information (5th bit) of the TOS (Type Of Service) field defined in the header of each IP packet used for the Internet.
>
> Aimoto, col. 8, lines 25-38.

Appellants respectfully submit that the packet switch disclosed by Aimoto is inherently different from the communications network recited by claim 1 because the claimed smart node determines the merit value after receipt of the messages from the source (in the claim terms, "for said received messages"), and dynamically reprioritizes the messages based on the determined merit value. This determining of a merit value, and subsequent reprioritization is simply not taught by Aimoto.

Appellants therefore submit that Aimoto cannot anticipate claim 1, and respectfully requests that the rejection of claim 1 and the claims depending therefrom be reversed by the Board.

Claims 4 and 9, and the claims depending therefrom

Claims 4 and 9 (as a method) each recite, in generally similar language, same merit value determination and reprioritization as claim 1 discussed above. Appellants respectfully submit that for the same reasons set forth above with regard to independent claim 1, Aimoto simply cannot anticipate claim 4 or claim 9. Therefore, Appellants respectfully submit that independent claims 4 and 9, and the claims depending therefrom are allowable and request the Board to reverse their rejection.

Third Ground of Rejection for Review on Appeal:

Appellants first note that Tonchev does not describe or even suggest determination of a merit value or reprioritization based upon such a value, and so cannot obviate the deficiencies of Aimoto discussed above. Moreover, claims 7, 8 and 10 each depend directly or indirectly from an independent claim that is clearly allowable over Aimoto, even in combination with Tonchev, for the reasons summarized above. Therefore, Appellants respectfully submit that claims 7, 8 and 10 are allowable in view of such dependency as well as for the subject matter they separately recite, in combination with the subject matter of their respective base claims. Appellants therefore respectfully request that the Board reverse the rejection of these claims under 35 U.S.C. §103(a).

Conclusion

Appellants respectfully submit that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: 10/7/2005

David M. Hoffman

David M. Hoffman
Reg. No. 54,174
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545

8. APPENDIX OF CLAIMS ON APPEAL

Listing of Claims:

1. (previously presented) A communications network, comprising:

at least one source unit configured to generate messages for relay;

a smart node capable of storing programming instructions, receiving messages for relay from said source unit, determining at least a merit value for said received messages, dynamically reprioritizing the received messages for relay based upon said merit value, and transmitting the reprioritized received messages; and

at least one portal node adapted to receive said reprioritized received messages transmitted from said smart node.

2. (previously presented) The communications network as specified in claim 1, wherein said smart node comprises an electronic computer for executing said programming instructions.

3. (previously presented) The communications network of claim 1, wherein said programming instructions comprise active messages.

4. (previously presented) A communications network, comprising:

at least one source unit configured to generate messages for relay;

a smart node capable of receiving programming instructions, storing said programming instructions, receiving messages for relay from said source unit, storing the received messages for relay in a queue, determining at least a merit value for said received messages, and dynamically reprioritizing the received messages for relay in said queue based upon said merit value;

at least one portal node adapted to receive said retransmitted received messages from said at least one smart node for relay; and

at least one communications node adapted to send said programming instructions to said smart node.

5. (previously presented) The communications network of claim 4, wherein said smart node comprises:

a message storage queue;

a transmitter;

a receiver;

a queue controller for writing messages received at said smart node into said message storage queue and for removing messages from said message storage queue for relay transmission by said transmitter; and

a dynamic reprioritization controller for specifying an order of transmission of said removed messages for relay transmission by said transmitter.

6. (previously presented) The communications network of claim 5, including at least one receiver for receiving said messages for relay from said source unit.

7. (currently amended) The communications network of claim 4 [1], wherein said merit value for said received messages is determined heuristically.

8. (previously presented) The communications network of claim 4, wherein said merit value for said received messages is determined heuristically.

9. (previously presented) A method for dynamic reprioritizing messages, comprising:

receiving messages from a source unit;

storing said received messages in a buffer unit;

determining a merit value for said received messages;

reprioritizing said received messages based upon said merit value; and

transmitting the reprioritized received messages.

10. (previously presented) The method of claim 9, wherein said merit value for said received messages is determined heuristically.

11. (previously presented) The method of claim 9, wherein said received messages are stored in a queue.

12. (previously presented) The method of claim 9, wherein a smart node reprioritizes said received messages.

13. (previously presented) The method of claim 12, wherein said smart node transmits said reprioritized received messages.

14. (previously presented) The method of claim 12, wherein said smart node receives programmable instructions from a communication node.

9. APPENDIX OF EVIDENCE

None.

10. APPENDIX OF RELATED PROCEEDINGS

None.